

Dairying and Land Use

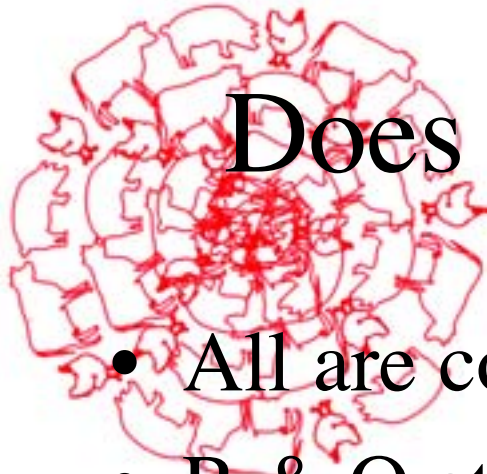
24 January 2002

Enhanced Nutrient Management on
Dairy Farms Seminar Series



Scale and Nutrients

- Problem must be studied at range of scales
 - rumen, cow, barn & storage, farm
 - neighborhood, township, watershed
 - county, state
- Ecological systems theory suggests different constraints operate at different scales



Does Some Scale Dominate?

- All are coupled, but to varying degrees
- R & O at sub-cow to farm scale
 - Evidence that this can/will solve the problem?
- Rules and permitting at state & federal level
 - See above
- Township scale certainly is interesting...



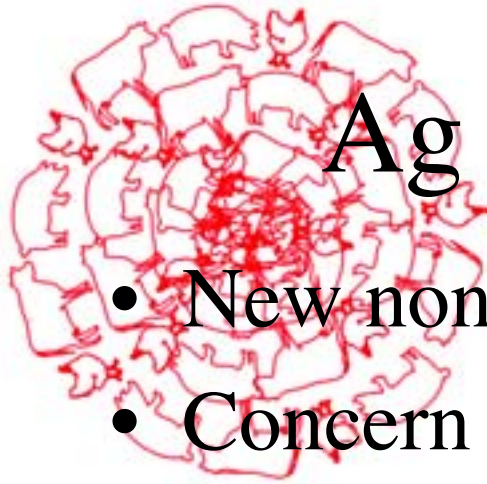
Township Scale

- Town is the governmental entity, township is surveyor's construct
- Nominally 6mi x 6mi
- Relevant to nutrient management because:
 - Length scale about what a farmer can/will haul manure
 - Towns have power to regulate land uses



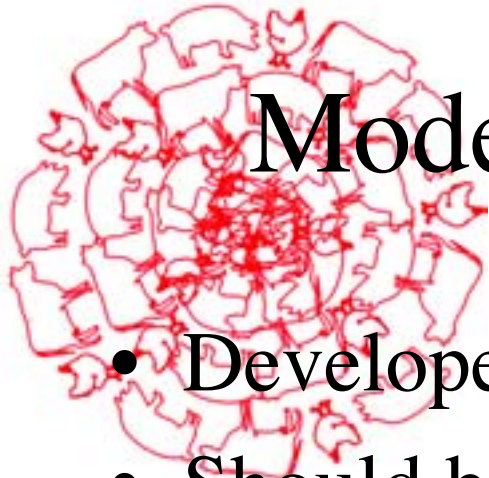
Land Use Planning

- WI is a patchwork quilt of land use planning
- Municipalities, Towns, and Counties
- Smart Growth Law
 - Incentives for levels of government to collaboratively plan
 - Zoning must be consistent with plans in future



Ag As Local Gov't Issue

- New non-farm rural complaints
- Concern that farms becoming too big to manage manure appropriately
- Some large enough to require CAFO permit
- New farms may be financed by outsiders
- Few, large farms means few farmers must control majority of land
- New workforce is attracted



Model Livestock Ordinance

- Developed by (allegedly) diverse committee
- Should be rolled-out next month
- Easiest way for local government to address problem
- But by avoiding public visioning & planning steps lacks local ownership



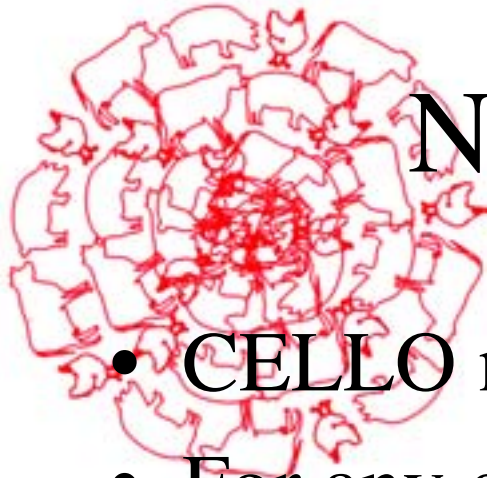
State-Level Policy

- Last Fall 2 sides of CAFO debate were talking legislation
- Dairy Business Association wished to reduce local veto power over large farms
- Env & Family Farm folks wished to shape state policy to prevent largest farms



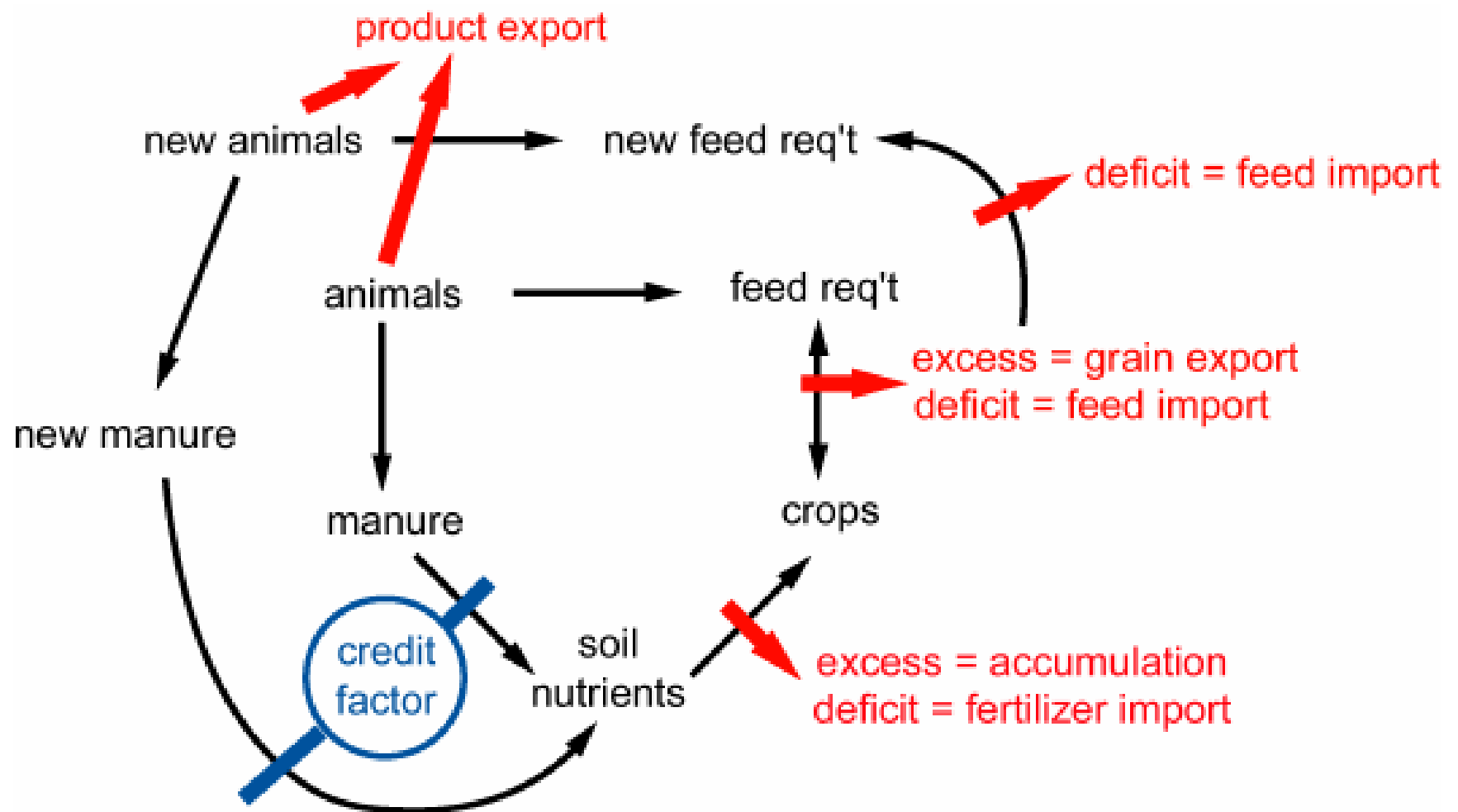
Nutrient Balances at Town Scale

- Legal power, appropriate scale, office holders close to many issues
- Data are not readily available
- Doug J-S has worked to generate town-level estimates of ag activity
 - Derived from WiDoR tax records, WISCLAND analysis of land use, Wi Ag Statistics Service data, and CAFO permits
- Heather Saam now on the case

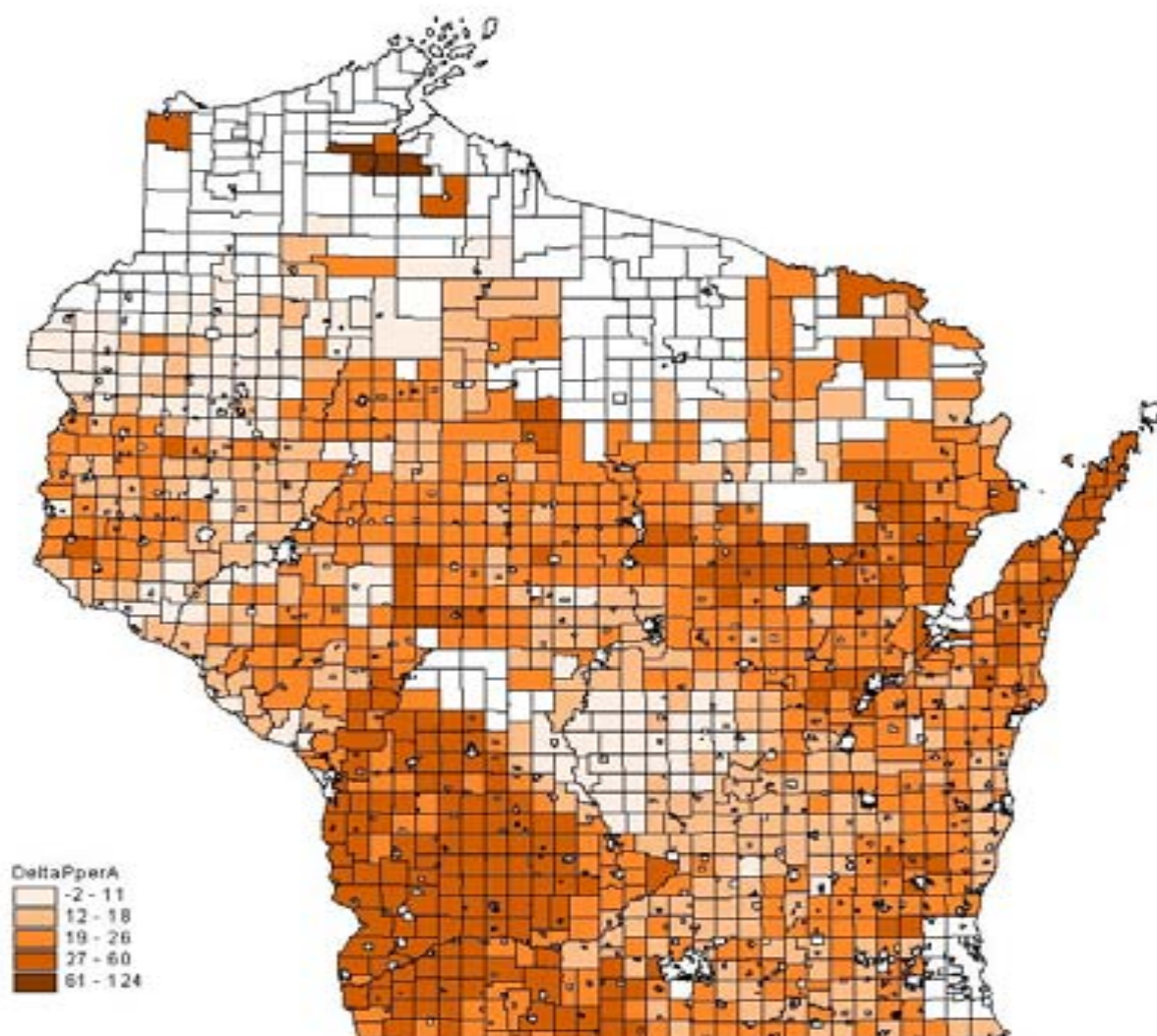


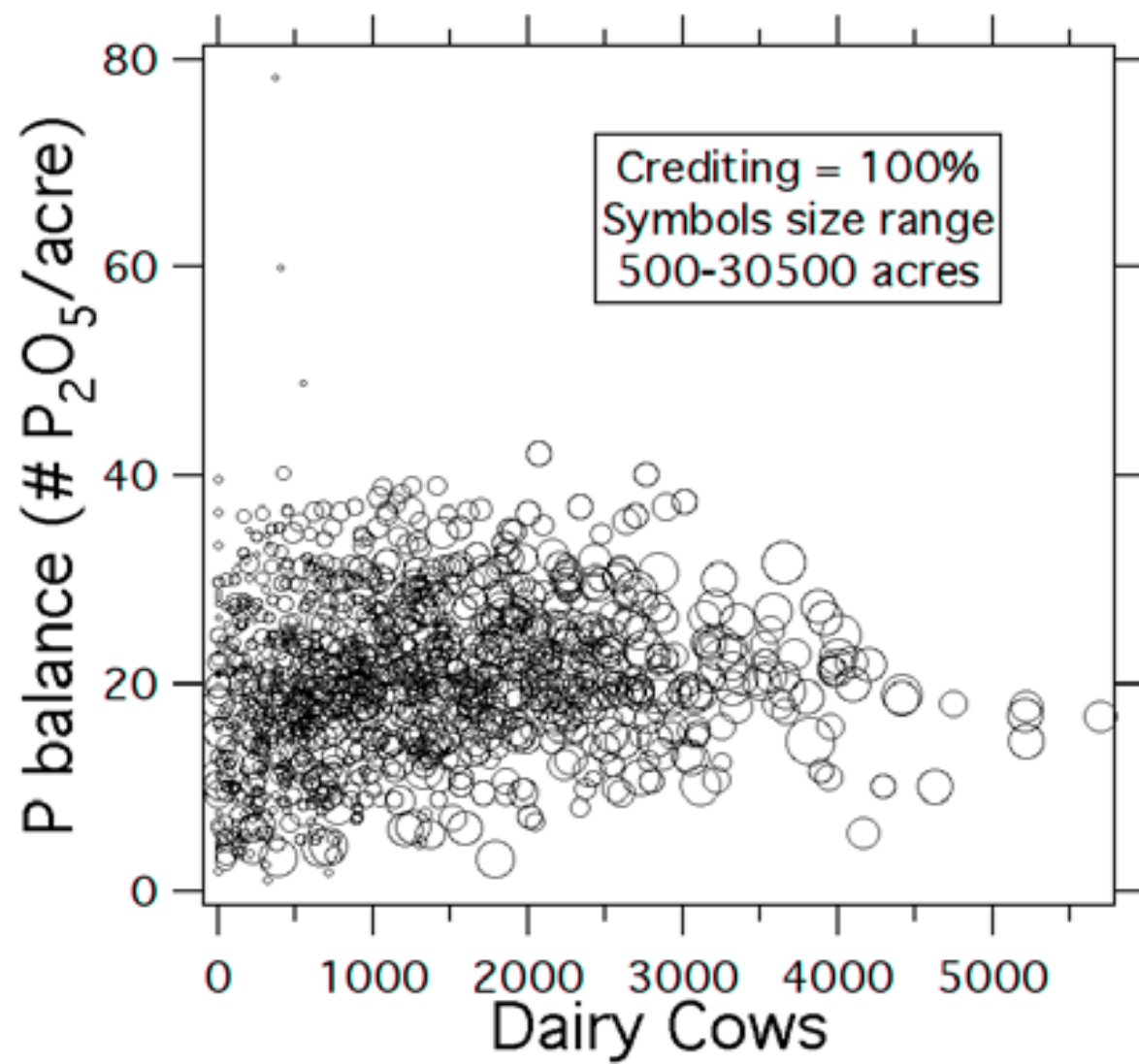
Nutrient Flow Model

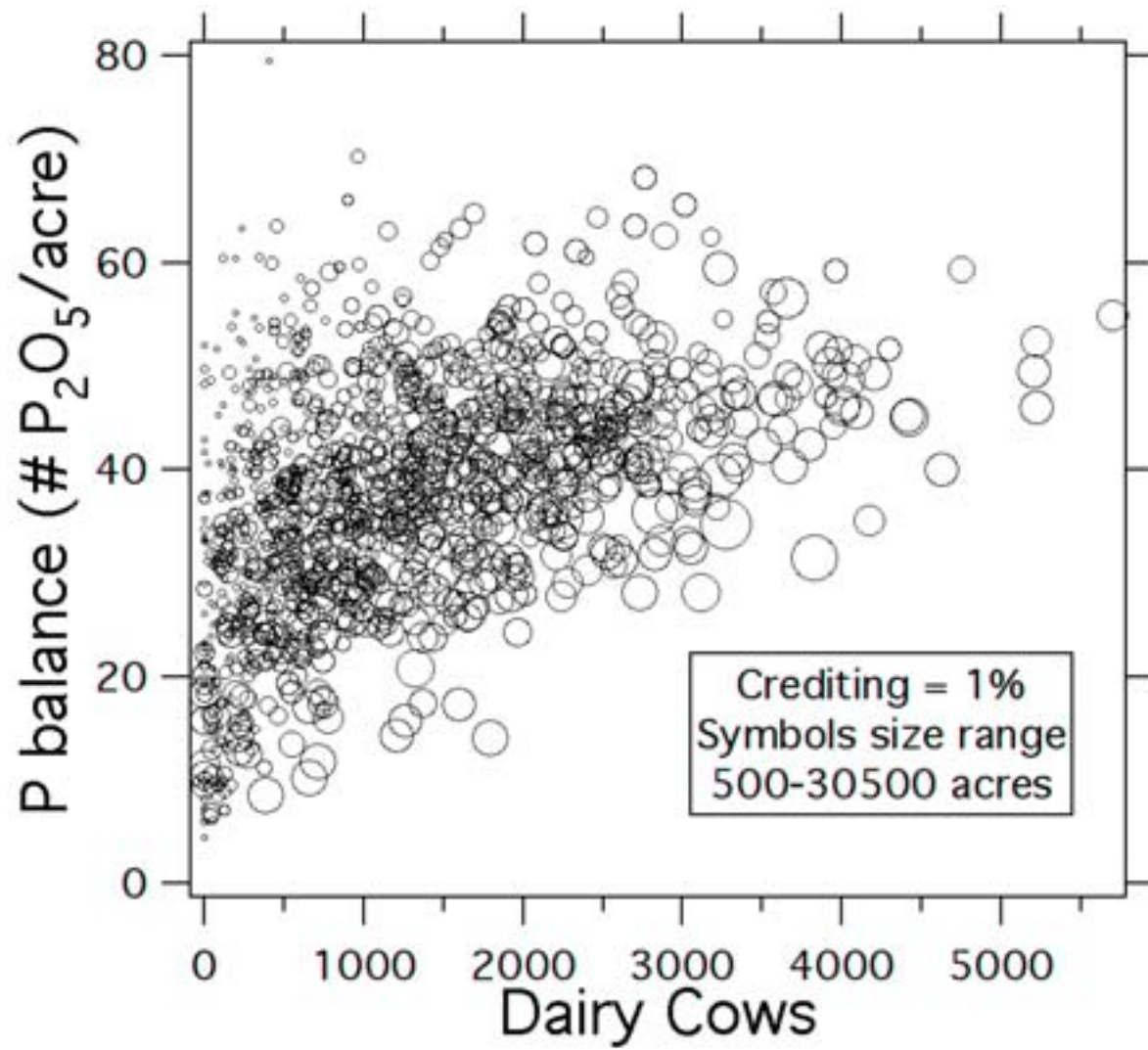
- CELLO nutrient model
- For any geographic area:
 - takes data typical of county WASS values,
 - and estimates nutrients flows
- Makes an appalling number of assumptions
 - Separate aggregate statistics
 - Feeding and cropping strategies

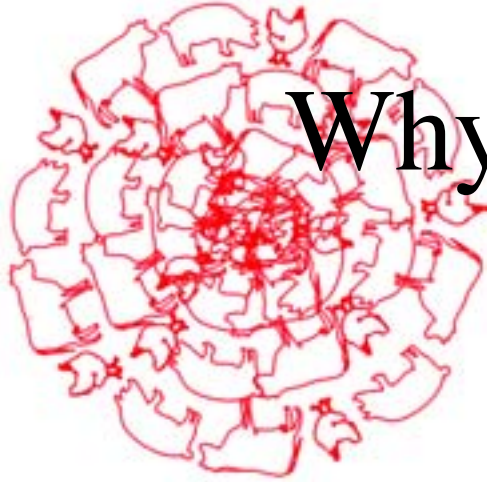


DeltaPperA



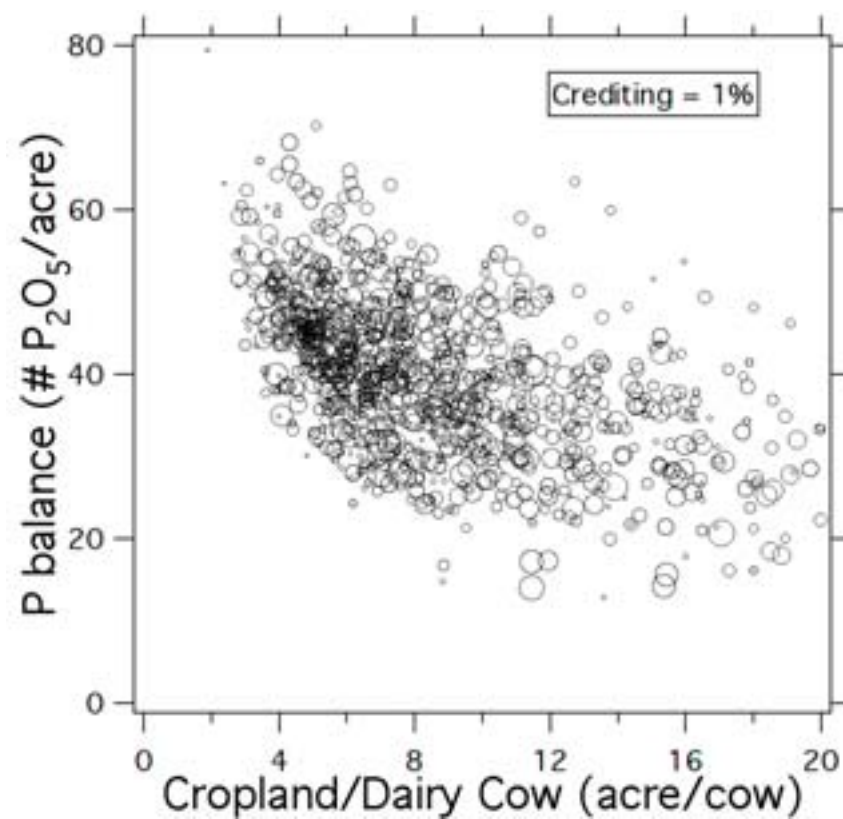
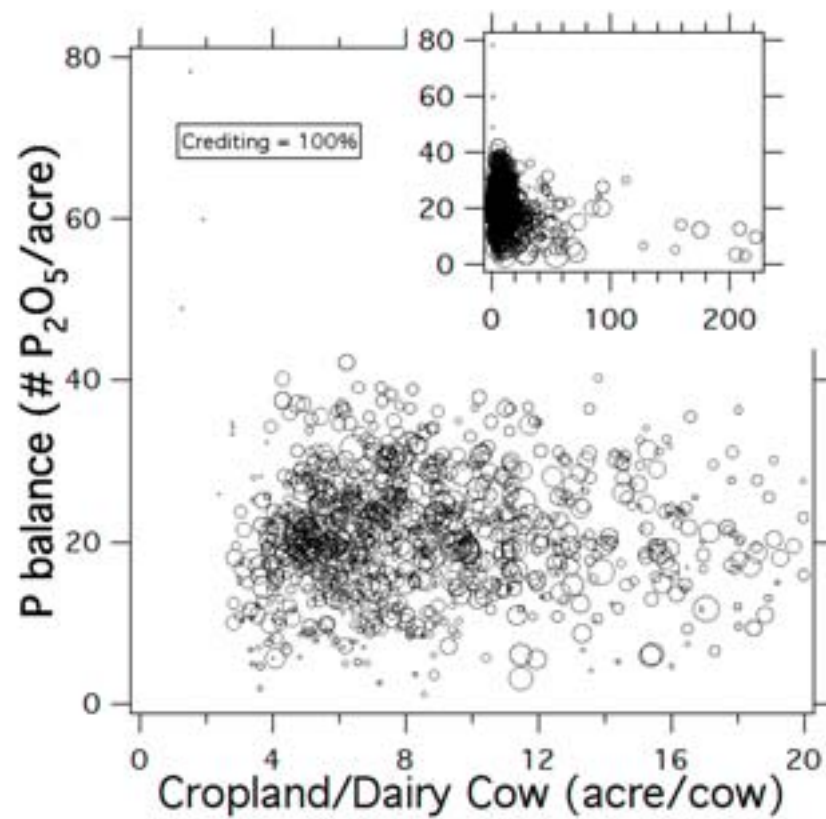


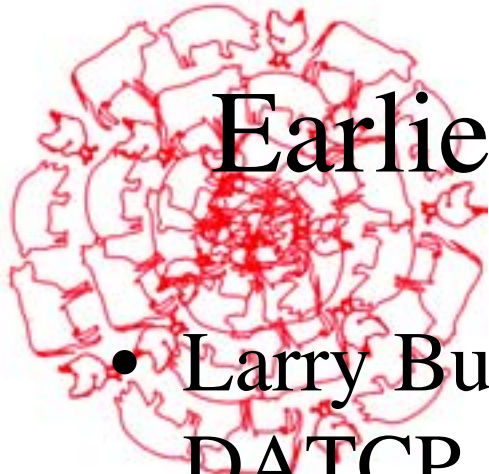




Why do P balances differ?

Town	A	B
P balance (#/acre)	+40	+11
Crop area (ac)	11830	11764
Dairy cows	2761	2792
Hogs & Pigs	1040	80
Alfalfa (ac)	9070	4470
Hay (ac)	1030	1420
Grain corn (ac)	1010	3110
Silage corn (ac)	230	1190
Soybean (ac)	370	1000





Earlier Wisconsin P Balances

- Larry Bundy, 1994 and 1998, for DNR and DATCP
 - Statewide
 - Change in Soil Stored = (Manure + Fert) - (Crop removal + Runoff)
 - In 1995, estimated a 7.5 #P₂O₅/acre excess
 - Matched well with observed soil test trends



Earlier Wisconsin P Balances-2

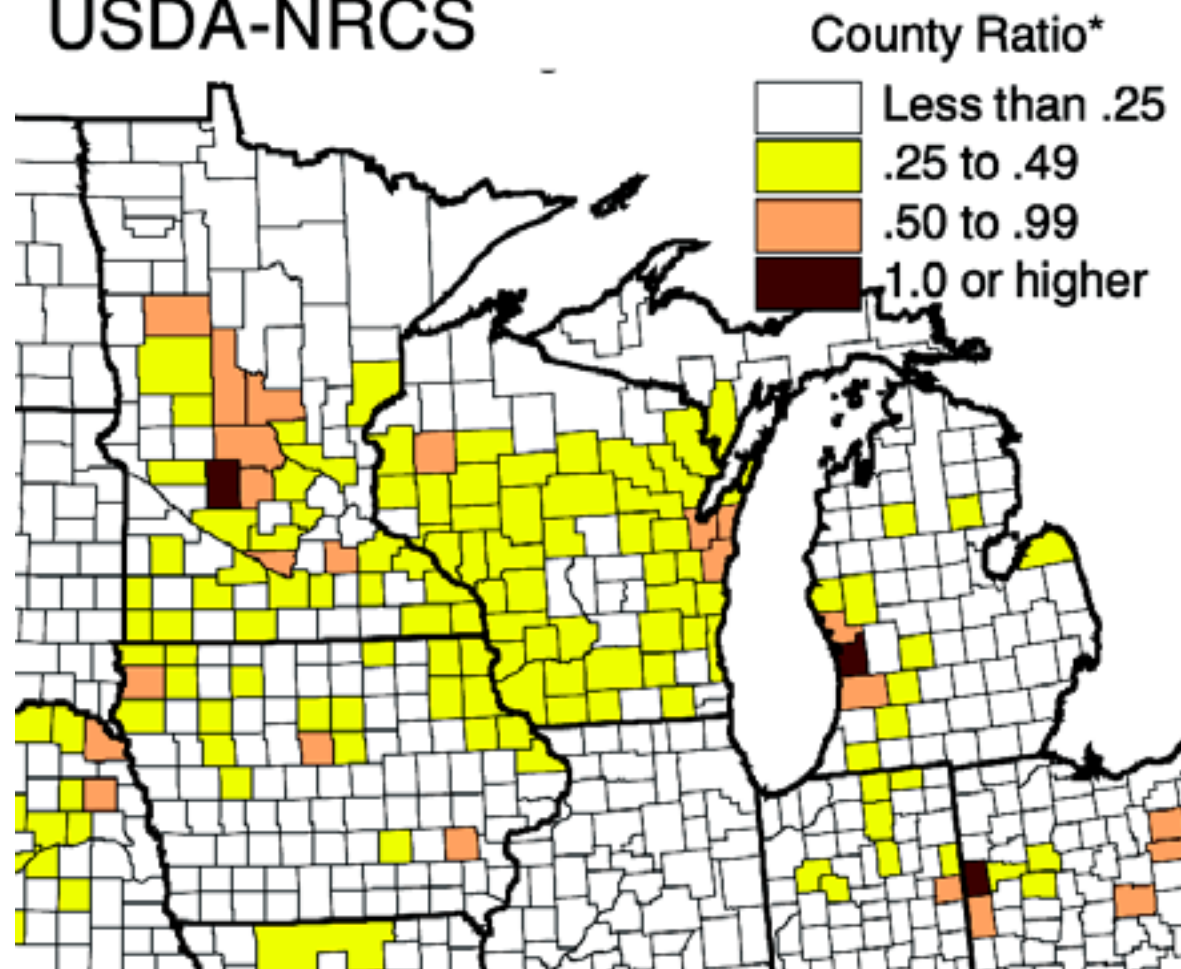
- USDA-NRCS study (2000):
 - “Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the United States”
 - Census of Ag farm level data (lucky folks!)
 - Manure recoverability factors and liberal assimilative capacity estimates

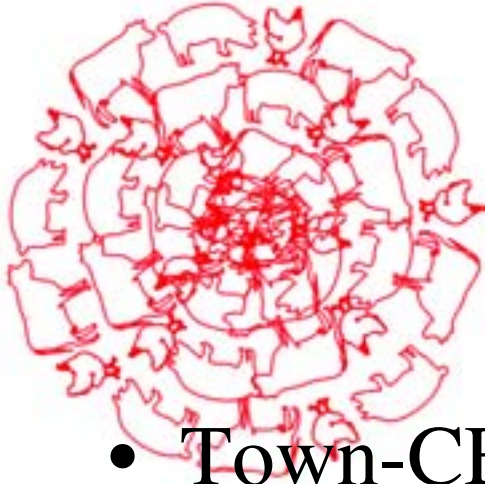


USDA-NRCS study (continued)

- Calculated two flavors:
 - On-Farm: assumed no sharing with neighbors
 - County-Wide: assumed willingness to ship manure where needed in county
- Calculated ratio of available manure nutrients to assimilative capacity

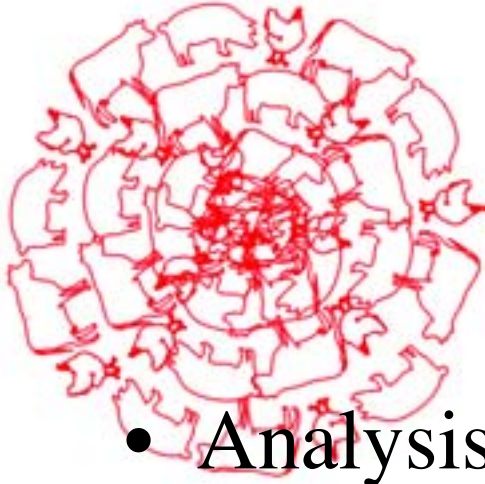
Manure P to Crop Capacity USDA-NRCS





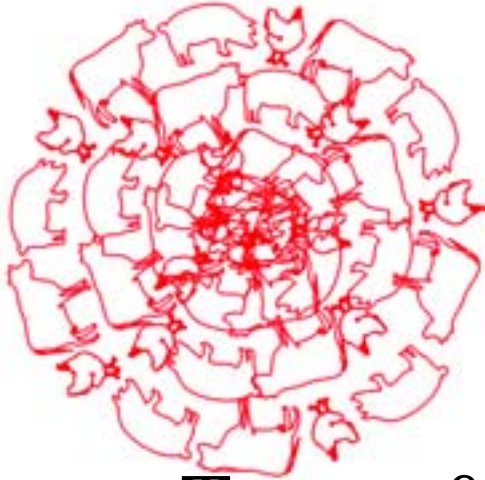
Conclusions

- Town-CELLO analysis indicates typically $20 + \text{\#P}_2\text{O}_5/\text{acre}$ annual imbalances, higher than earlier estimates
- Fertilizer assumptions do not permit drawdown, but statewide application is below reported sales
- Crediting reduces excess but not completely



Conclusions

- Analysis for future permitting of livestock should include all sources and sinks in vicinity
- Access to more data on fertilizer and feed sales would help analysis of efforts to improve water quality



Conclusions - 3

- Towns & counties should not be constrained in their efforts to arrive at unique place-specific solutions to the challenges of consolidation in and oversight of livestock production.